# **PSOA2TPTP:** Designing and Prototyping a Translator from PSOA RuleML to TPTP Format

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# **System Description**

**Goal:** Target the TPTP input format of the VampirePrime reasoner to provide deduction services for PSOA RuleML

# **System Architecture**

PSOA Presentation Syntax

ANTLR-based

SOA2TPTP: An ANTLR-based translator that maps **PSOA RuleML knowledge bases and queries to TPTP** 

### **Source Language:**

PSOA RuleML: Positional-Slotted Object-Applicative Rule Language

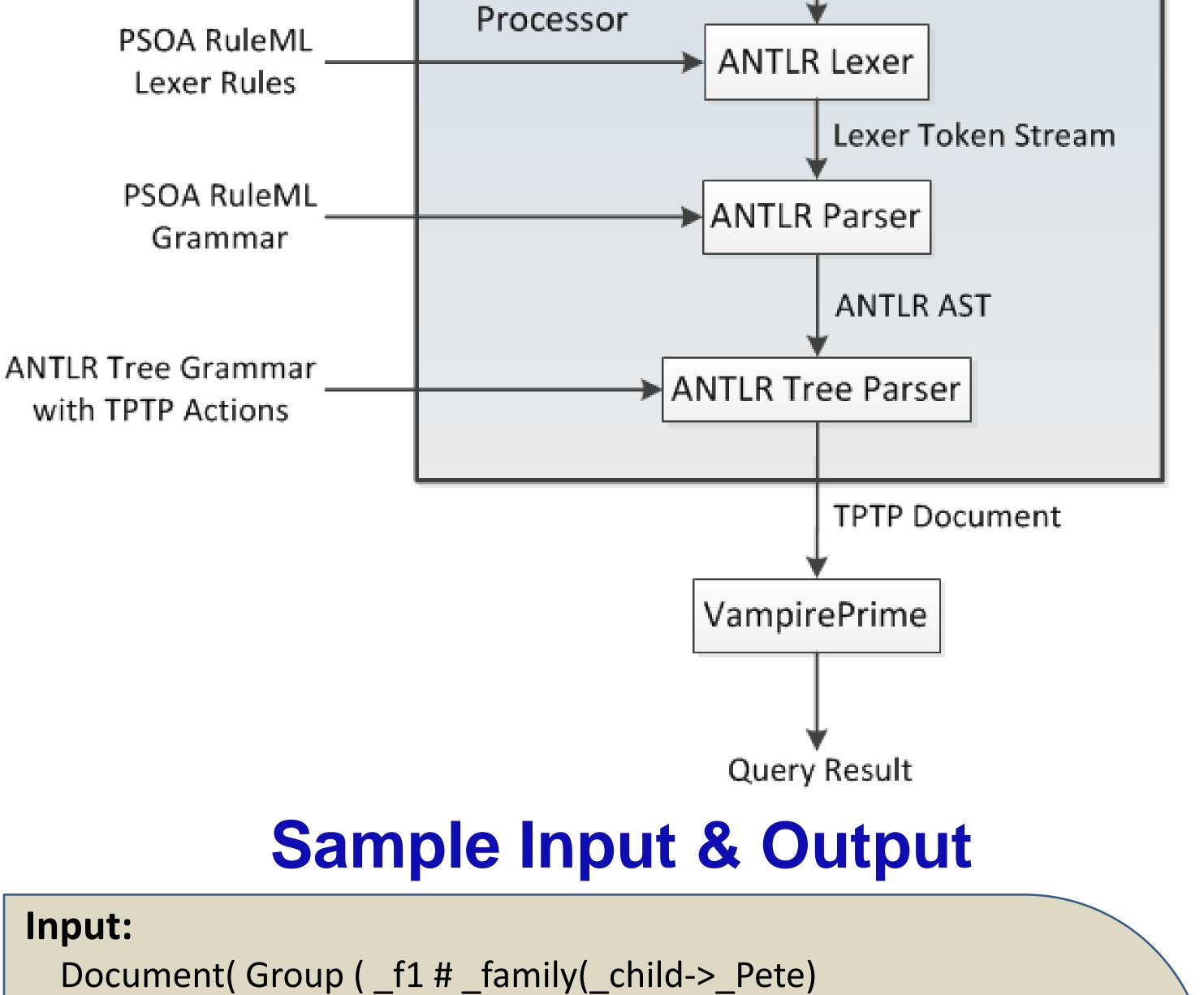
- Combines the ideas of relational (predicate-based) and object-oriented (frame-based) modeling
- Example of psoa term:

\_f3 # \_family (\_Mike \_Jessie \_child ->\_Fred \_child ->\_Jane)

Object Class n-Tuple (here: n=2) Slots for family's 0 or more children representing a couple Identifier

#### **Target Language:**

TPTP: A file format for describing reasoning problems Covers full first-order logic and is supported by many reasoners



#### Sample formula:

fof (someone\_got\_an\_a, axiom, (?[H]: (human(H) & grade(H) = a)))

a formula in the first-order logic form auxiliary information

### **Tools:**

- VampirePrime
  - ✤ A derivative of one of the fastest reasoners in the world
  - Supports query answering by implementing Incremental Query Rewriting
- ANTLR Parser Generator Framework
  - ANother Tool for Language Recognition
  - A sophisticated parser generator used to implement language interpreters, compilers, and other translators
  - Generates parsing code for PSOA RuleML from specified lexer rules, grammar rules and tree grammar rules

\_f2 # \_family(\_husb->\_John \_wife->\_Mary \_child->\_Tom) \_Amy # \_Person([\_Female 1963] [\_unb] \_job->\_Engineer) \_f3 # \_family(\_Mike \_Jessie \_child->\_Fred \_child->\_Jane)

**Query:** \_Amy # \_Person (\_job -> \_Engineer) **Output:** 

fof(fact1, hypothesis,

member(f1, family) & sloterm(f1, child, pete)). fof(fact2, hypothesis,

member(f2, family) & sloterm(f2, husb, john) & sloterm(f2, wife, mary) & sloterm(f2, child, tom)). fof(fact3, hypothesis,

member(amy, person) & tupterm(amy, female, 1963) & tupterm(amy, unb) & sloterm(amy, job, engineer)). fof(fact4, hypothesis,

member(f3, family) & tupterm(f3, mike, jessie) & sloterm(f3, child, fred) & sloterm(f3, child, jane)). fof(conj1, conjecture,

member(amy, person) & sloterm(amy, job, engineer)). VampirePrime Output:



